ENGLISH LANGUAGE TRANSLATION OF THE PCT INTERNATIONAL APPLICATION AS FILED

VERTICAL TRACTION SYSTEM FOR ELEVATORS WITH BUILT-IN ADJUSTMENT, SAFETY AND EMERGENCY MEANS

Vertical traction system for elevators with built-in adjustment, safety and emergency means.

The object of the present invention patent consists of an innovative lift elevation system with built-in adjustment, safety and rescue means.

Due to the continuous demand in the lift market for products that are increasingly well designed and sophisticated, elevation equipment that is characterised as follows is currently being sought.

- Elimination of upper machine room
- Improved performance of equipment for reducing energy consumption
- Reducing motor power
- Eliminating the use of oil in the lifts so that they fit in with the ecological philosophy of today
- Increasing the range and capacity of lifts with a small sized system
- Increasing the manoeuvring speed of lifts without cost increase, even with a single piece of equipment so that part of the current costs can be reduced
- Unification and standardisation of equipment with production cost reduction
- Facilitating the ways to rescue lift passengers, and even making them function without electrical current, by using small batteries
- Making the motors generators and thus even producing energy and making it regenerative
- Achieving an electrical energy consumption reduction of 60% of what is currently being used

All of the present drawbacks are surpassed with the use of the vertical elevator traction system with built-in adjustment, safety and emergency means, object of the present disclosure.

Said system differs from what is currently available on the market since it offers a wider field of application from 4 to 26 people; it does not require a machine room; all of its models use a tractor machine; it does not require oil for its maintenance; it offers high performance and low installed power; it features a capacity for high-speed use.

The functioning, as well as the nature of the system described herein will be better understood with the aid of the illustrations attached at the end of the patent.

Figure 1: Right profile view of the motor
Figure 2: Raised section view of the motor
Figure 3: Left profile view of the motor

Figure 4: Right profile view of the elevator-motor assembly
Figure 5: Left profile view of the elevator-motor assembly

The system described herein is mainly based on motor equipment as seen in figures 1, 2 and 3, consisting of a solid and robust body that provides movement to the cabin and counterweight. It is basically made up of a rotor (1), an asynchronous stator (2), a traction pulley (3), an electromechanical break (7) and a movement detection system.

Rotor and asynchronous stator

Thus named due to the rotating magnetic field that originates within its body, it has a small slip, minimal and reduced, obtained by the motor design and production system. The asynchronous concept implies lower supply costs than synchronous motors. What is obtained with this rotor model is similar in features to the former one, since it is provided with very small slips (between 2% and 5%) when it is common to reach up to 15%. This implies that the performance is greater and consumption is lesser. The rotor (1) features a "squirrel cage" made of copper in the form of a quantity of around 66, approximately 5 X 16 mm, rectangular bars in a circle, with an inclination of 8% of the bars, and a diameter of 280 mm and central ring.

The stator (2) is made up of 0.5 mm-thick magnetic sheets and 72 winding grooves, multiple of 12 poles. There are different types of winding threads depending on the power to be obtained. This is characterised by the total length of the package, there being different types.

The external circular geometrical conception is always the same, independent of the power, which simplifies the design of the assembly.

The set of stator sheets (2) is fixed between two rings with 8 through screws that form the fixed statorical set. The assembly is mounted on two lateral covers (6) that it incorporates, screwed onto a part where, in turn and on two bearings, the axis (4) and rotor (1) mentioned above are situated.

As forced, unidirectional ventilation, the air crosses the entire rotor-stator assembly from one end to another, as can be observed in figure 2, being closed at the opposite end to the pulley with a hollow cover (5) where the warm air is absorbed and expulsed to the exterior. The maximum temperatures that any internal part of the motor acquires are lower than 65° C when fully operating.

The technological advancement is mainly concentrated in the concept of the low slippage and high torque asynchronous motor, unknown up to the present in this field. This apparatus makes the use of permanent magnet synchronous motors obsolete, being much more expensive as regards their construction and the

different models being built to provide for the different power demands, since it can offer, by way of a single model, powers from 2.2 Kw to 20 Kw, by varying frequency and voltage of the input current. It is also characterised by the fact that it does not feature gears since its action is based on direct motor-pulley traction.

Another advantage found is that its working life is lengthened due to the more bearable type of work it carries out with regards maximum temperatures, guaranteeing a working life of between 30 and 60 years.

TRACTION PULLEY

The traction pulley (3) is rigidly incorporated into the very axis (4) of the rotor (1), so that it transmits the motor torque to the lift by way of the wires that twist 180° around its upper section. On said motor pulley (3), a flat, cylindrical section is situated where the brake shoe operates it directly and the brake torque required by the elevator is executed.

The motor pulley (3) is of variable size depending on the number of wiring grooves for greater or lesser passenger capacity and oscillates between a minimum of three wires up to seven. It always has a fixed diameter of 320 mm.

ELECTROMAGNETIC BRAKE

The electromagnetic brake (7) made up of electromagnet with overdrive current and brake shoes on the pulley plate (3) described. It functions by holding the braked elevator at rest.

MOVEMENT DETECTION SYSTEM

Formed by a digital encoder (8) and joined elastically to the rotor axis (4) in order to transmit information on the rotor (1) rotation speed. This provides high security and reliability of the component.

Within the incorporation of the system object of the present invention patent, is the positioning in an accessible place. As can be seen in figures 4 and 5, for this purpose the machine is situated at the upper part of the lift shaft resting on two sections (9) on the wall of the building itself, where the pressure force is transmitted, adequately isolated.

Likewise the motor – lift joint system includes an electronic function protocol for rescuing people in two possible ways: a) automatic rescue due to lack of exterior energy; b) manual rescue with exterior current.

For this purpose it requires a manoeuvre box and another emergency access normally located at the last stop. In this way, 84 V batteries (7 units of 12 V) are

incorporated in order to make the motor function directly by way of a frequency shifter as well as in order to open the door of the lift.

With system a), in case of a lack of exterior current, the lift directly accesses the floor level and opens the lift door, thus freeing the trapped persons, carrying out the action automatically. This system tends to lower the lift but it raises it depending on whether the minimum torque is insufficient for executing the manoeuvre, thus inverting the turning direction. If it is sufficient, it goes directly down to the floor below. In both cases it ends by stopping, opening its doors and deactivating the rescue system. If the emergency is produced at the floor level itself, the doors open immediately.

With system b), in case there should exist external electrical current and the movement of the cabin is carried out manually, since some safety contact is deactivated. For this purpose it is manually bridged and the cabin is moved, under control, electrically to the floor level and the doors are opened.

The system is provided with visual and acoustic movement detectors of the arrival of the cabin to a floor level. Therefore the rescue procedure is carried out electro-mechanically, automatically or manually, in complete safety.

As can be observed, the present invention patent is a system that is innovative in the market, with features that are superior to what currently exists and improves the currently existing technique, allowing the generation of higher quality service in the traction system, and acting more quickly and in a more economical way.

And, having sufficiently described the nature and functions of the system, as well as a practical embodiment of it, it only needs be added that in both the shape and materials, size and execution may undergo modifications, as long as they do not substantially alter the characteristics claimed in the section below.